

PBAR BPM VXI Down Converter Checks

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The VXI Down Converter card is a single slot VXI card that determines the IF bandwidth of the PBAR Beam Position Monitoring System. Its capabilities include a -10 to +30 dB variable gain amplifier and a down converter. The card consists of 2 modes; the low frequency mode (100kHz. To 5MHz) and the high frequency mode (52.8MHz. in a 5MHz bandwidth). The low frequency mode passes signals directly to its output without frequency conversion. The high frequency mode performs a frequency conversion to about 18.1 MHz.

All reference plots can be obtained from the PBAR BPM DDDC binder located in my office.

General Tests

A. S11 Tests-Inputs/Outputs/LO

- 1.) Setup the network analyzer as shown in the S11 reference measurement plots.
- 2.) Set network analyzer output power to 0dBm.
- 3.) Calibrate network analyzer for S11 using open, short, and load.
- 4.) Measure S11 for DC input channels and compare to reference plot A.
S11 should be within 1dB of the reference plot.
- 5.) Measure S11 for DC output channels and compare to reference plot B.
S11 should be within 1dB of the reference plot.
- 6.) Measure S11 for DC LO input channel and compare to reference plot C.
S11 should be within 1dB of the reference plot.

B. Initialization

- 1.) Power up crate, make sure Internet and terminal cables are connected to Kinetic Systems slot 0 controller.
- 2.) Double click on BPMtest icon on desktop.

Run "dctest" to ensure that all cards have been initialized and that they appear in the list provided by the "I" command.

C. Channel LO Sensitivity and LO Bit

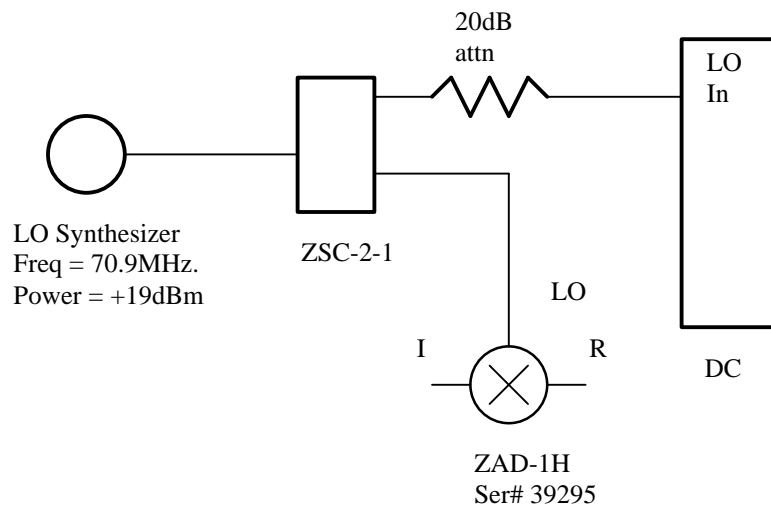


Figure 1

- 1.) Set LO synthesizer frequency to 70.9MHz. and power to +19dBm.
- 2.) Connect synthesizer output via splitter and 20dB pad to each LO input as shown in Figure 1.
- 3.) Adjust the power of the synthesizer to find threshold for the LO light turning on and off. This should occur between +13 and +19dBm.
- 4.) Using the l (ell) command of "dctest", verify that the LO bit is functioning.

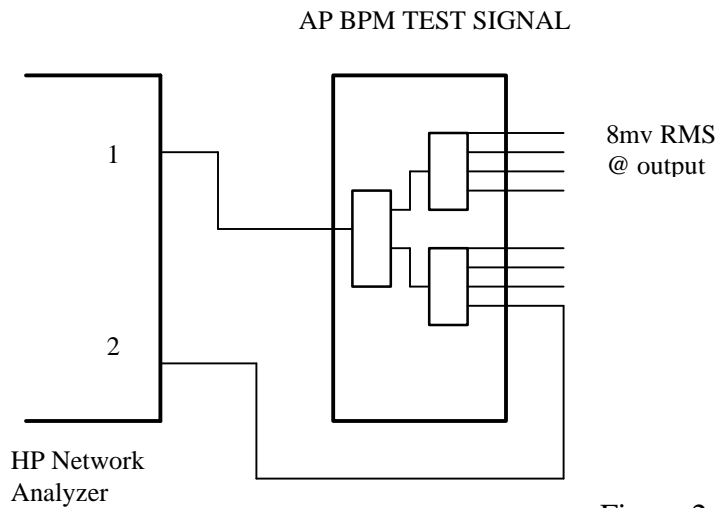


Figure 2

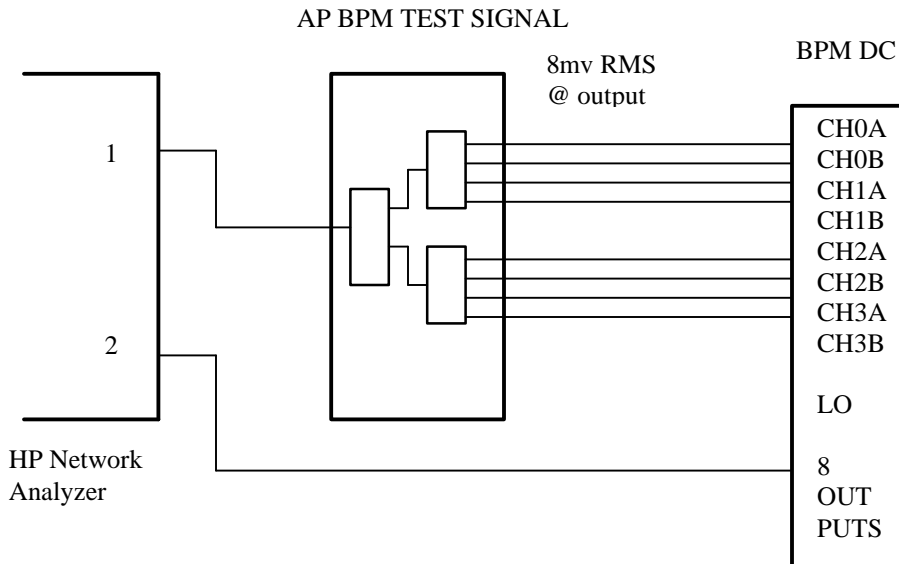


Figure 3

D. Low Frequency Mode Tests

- 1.) Set up Network Analyzer as shown in Reference plot D. (Start Freq = 100kHz, Stop Freq. = 500MHz, S21 measurement, Log scale/Magnitude, 10dB/div, Ref = -10dB, Marker @ 2.4MHz.)
- 2.) Perform calibration (thru) as shown in Figure 2. Obtain 8mvRMS at output of AP BPM TEST SIGNAL using power adjustment of source and attenuation pads at output.
- 3.) Connect cables as shown in Figure 3.
- 4.) Set Card Mode to LF using "dctest".
- 5.) Set Card Gain to +30dB.
- 6.) Measure the frequency response and compare to Reference Plot D. Gains should be within +/-0.2dB.
- 7.) Check the attenuator by setting card gain to cycle using "dctest".
- 8.) Verify that the power is changing in 10dB increments over a 40dB range.

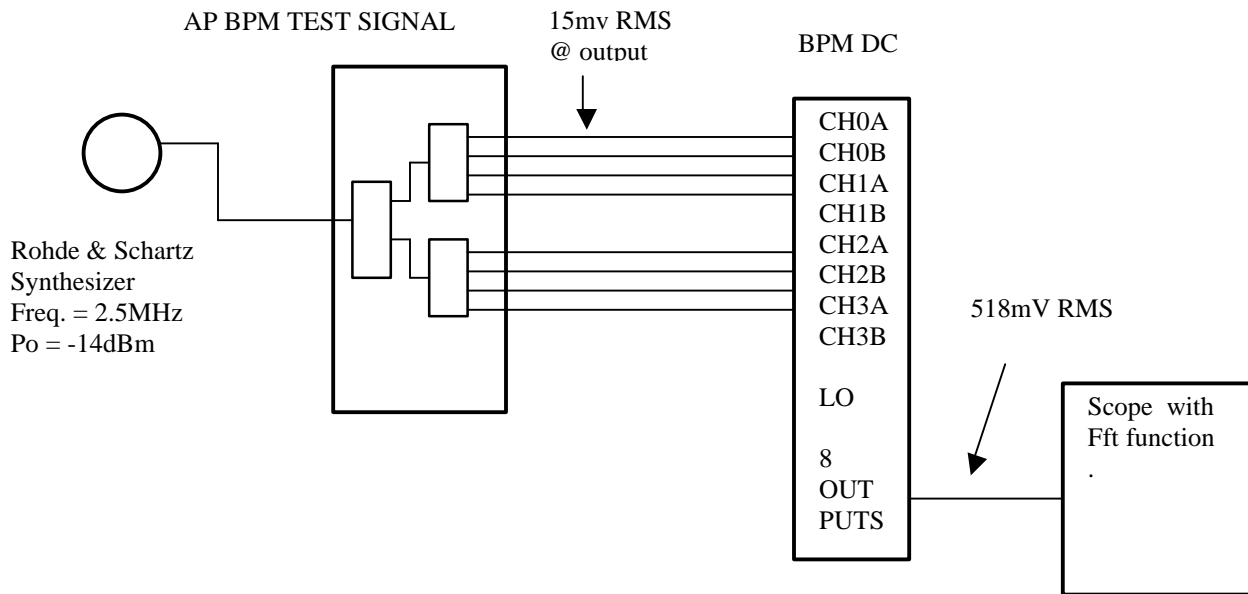


Figure 4

- 9.) Set up synthesizer so that 15mVRMS, freq. = 2.5MHz., appears at BPM TEST SIGNAL output.
- 10.) Set up scope for Fft measurement.
- 11.) Connect cables as shown in Figure 4.
- 12.) Set Card Mode to LF.
- 13.) Set Card Gain to +30dB.
- 14.) Measure C/I on the scope. Be sure to compare the signal at 2.5MHz. with the highest side band. This number should be 50dB or greater.

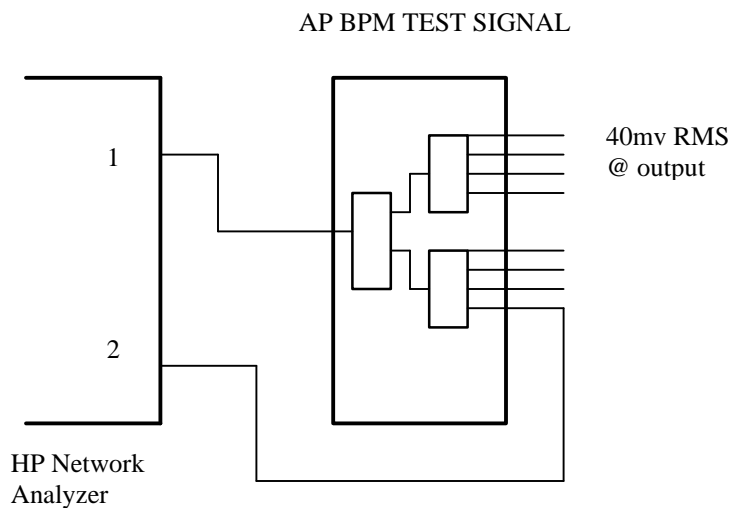


Figure 5

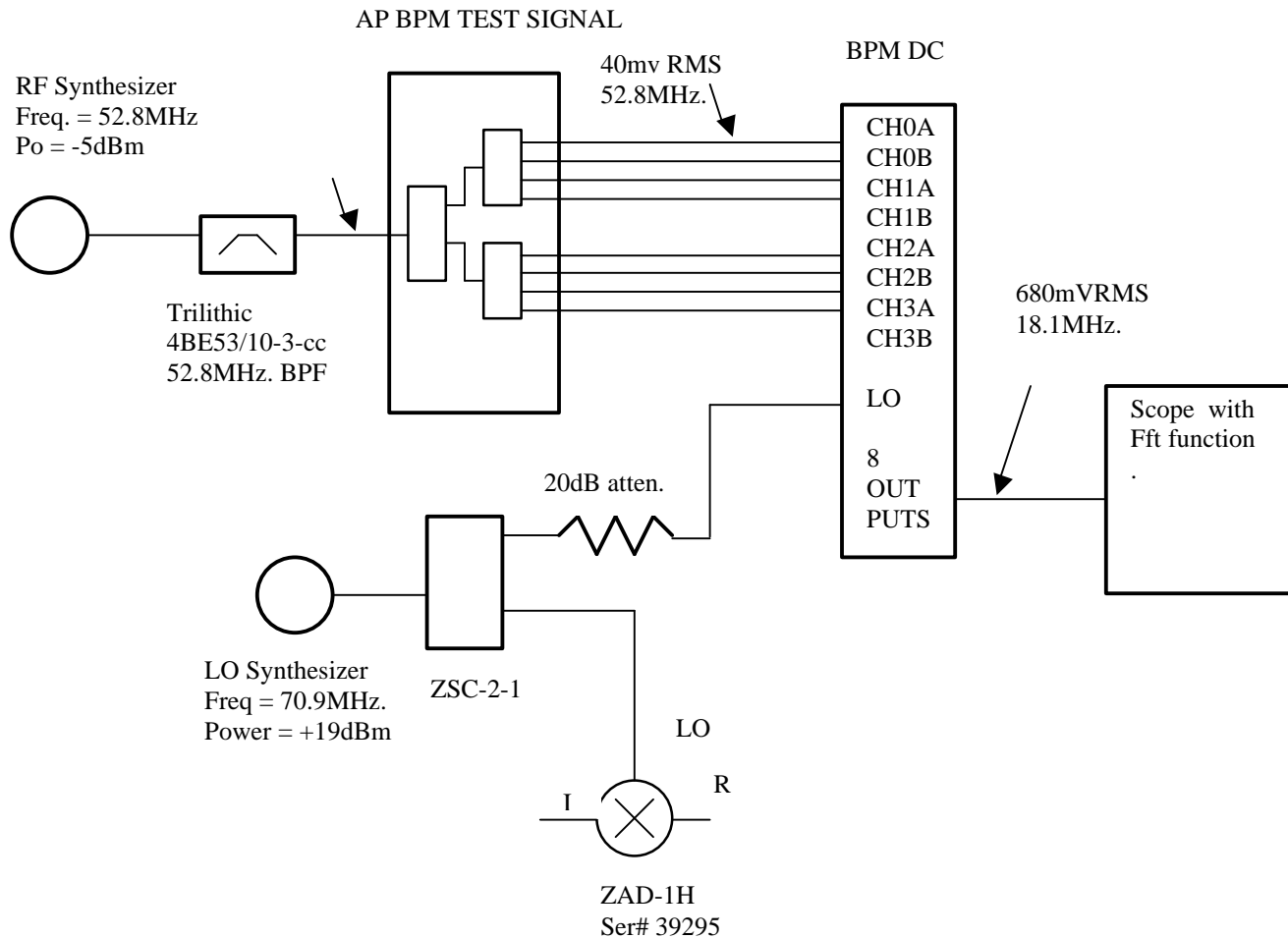


Figure 7

- 9.) Set up synthesizer so that 40mVRMS, freq. = 52.8MHz., appears at BPM TEST SIGNAL output.
- 10.) Set up scope for Fft measurement.
- 11.) Connect cables as shown in Figure 7.
- 12.) Set Card Mode to HF.
- 13.) Set Card Gain to +30dB.
- 14.) Measure C/I on the scope. Be sure to compare the signal at 18.1MHz. with the highest side band. This number should be 50dB or greater.